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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,816	11/22/2002	Canan Uslu Hardwicke	120365	9642
6147	7590	03/24/2005		EXAMINER
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			VERBITSKY, GAIL KAPLAN	
			ART UNIT	PAPER NUMBER
			2859	

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s) HARDWICKE ET AL.
	Examiner Gail Verbitsky	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 14 December 2004.  
 2a) This action is FINAL.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1 and 3-29 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1 and 3-29 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____

**DETAILED ACTION**

***Specification***

1. The disclosure is objected to because of the following informalities:
  - A) Paragraph [0024] in page 6 is missing,
  - B) EXAMPLE in paragraph [0034] has not been described. Does it refer to paragraph [0035]?
  - C) The "means for measuring a change" as stated in claims 1, 4 has not been clearly described in the specification. It appears from the newly amended claims that the "means for measuring a change" is different from a thermocouple as described in the specification, paragraphs [0028] and [0032] since now, the invention is directed to a strain or a combination of the strain and temperature measurement, but not a (single) temperature measurement. Therefore, applicant should provide means for measuring change in property relating to the strain and/ or combination of temperature and strain.
  - D) the limitation stating that the thermal strain is "positive" has not been described in the specification.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 5, 17, and 25-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In this case,

Claims 1, 5, 17, and 25-26: the limitation stating that the thermal strain is "positive" has not been described in the specification.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5, 8-11, 13-16, 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Article: "Thin film temperature sensors for gas turbine engines: problems and prospects" by Budhani et al. [hereinafter Article].

Article discloses a device in the field of applicant's endeavor. Article teaches to deposit thin film thermocouple (electrically conducting films/ dissimilar materials Pt/Rh/ two spaced apart thermocouple films/ legs) onto an insulator/ dielectric (first electrically non-conducting film) comprising NiCoCrAlY and aluminum oxide/  $AL_2O_3$ , the insulator remains dielectric and adhered when placed onto a substrate of a blade (component) during the entire cycle of measurement. The device measures change in property, such as a temperature of the blade by generating an electrical potential between the

thermocouple legs (by definition of thermocouple). It is inherent, that, in order the thermocouple operate properly, both thermocouple legs join at some point to form a thermocouple (hot) junction, and otherwise, inherently, spaced apart. It is inherent, that thermal coefficients of expansion of all the films are selected so as to ensure that the films remain adhered to each other during heating/ measurements. Furthermore, it is inherent, that the device has a means to detect change in property of the thermocouple and relate it to a condition/ temperature change of the blade. The device also comprises a *second insulation* aluminum oxide growth/ coating.

With respect to the preamble of the claims: the preamble of the claims does not provide enough patentable weight because it has been held that a preamble is denied the effect of a limitation where the claim is drawn to a structure and a portion of the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. Kropa v. Robie, 88 USPQ 478 (CCPA 1951).

Although the Article does not explicitly describe the particular positive less than 0.006 strain, the fact that the article teach all the materials as claimed/ described by applicant, will imply that the device would provide the same positive less than 0.006 strain as claimed by applicant.

With respect to claims 25-27: the method steps will be met during the normal operation of the device stated above.

6. Claims 6, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Article in view of EP0908713A1 [hereinafter EP].

Article discloses the device as stated above in paragraph 5.

Article does not explicitly teach that the second electrically non-conducting layer (insulator/ dielectric) disposed on/ coating the thermocouple legs, as stated in claim 6, and a third dielectric film disposed between the thermocouple legs, as stated in claim 7.

For claim 6: EP teaches in Fig. 9i a device comprising a (second) protecting dielectric/ insulative (alumina) coating/ film 68 coating the thermocouple legs. Inherently, that in such a structure, the thermocouple legs 36 and 40 will be sandwiched between two dielectric films.

For claim 7: as shown in Fig. 5 and paragraph [0019] of EP, the thermocouple legs 36, 40 are laterally disposed and electrically isolated from each other and coated/ separated by a (third) protecting dielectric layer 68.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose a second electrically insulative film on top of the thermocouple, disclosed by Article, as taught by EP, so as to protect the thermocouple from contamination in a harsh environment, in order to provide more stability and thus, accuracy of measurements.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose a third electrically insulative film on top of the thermocouple, disclosed by Article, as taught by EP, so as to protect the thermocouple from contamination in a harsh environment, in order to provide more stability and thus, accuracy of measurements.

7. Claims 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Article in view of Chapman et al. (U.S. 6568848) [hereinafter Chapman].

Article discloses the device as stated above in paragraph 5.

Article does not explicitly teach a method of communicating temperature signal (link), i.e., RF, as stated in claims 28-29.

Chapman teaches that a temperature signal can be transmitted by RF.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the method of signal transmission, disclosed by Article, with an RF signal transmission, as taught by Chapman, because both of them are alternate types of signal transmissions which will perform the same function, of transmitting the temperature signal, in order to be evaluated, if one is replaced with the other.

With respect to claims 28-29: the method steps will be met during the normal operation of the device stated above.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Article in view of Rimai et al. (U.S. 5411600) [hereinafter Rimai].

Article discloses the device as stated above in paragraph 5.

Article does not explicitly teach the limitations of claim 12.

Rimai discloses in Fig. 5 a flexible metal substrate 50, an insulation layer (electrically non-conductive) 52 on a portion of the substrate, a metal layer (electrically conductive) 54 is on a portion of the insulation layer 52 and extends beyond, so as to

contact a portion of the substrate 50 so as to form a thermocouple junction (col. 10, lines 42-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by article, so as to extend the thermocouple junction beyond the insulation, as taught by Rimai, so as to provide the thermocouple junction directly on the substrate and with the substrate, in order to minimize the number of structures, and thus, improve accuracy of measurements.

With respect to the preamble of the claim: the preamble of the claims does not provide enough patentable weight because it has been held that a preamble is denied the effect of a limitation where the claim is drawn to a structure and a portion of the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. Kropa v. Robie, 88 USPQ 478 (CCPA 1951).

#### ***Allowable Subject Matter***

9. Claims 1, 3-4, 17-24 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112. The claims would be allowable because the prior art fail to teach a system wherein a "change in said property relating to said condition of the turbine engine component being electrical resistance of said film of said electrically conducting material when said condition is strain, and said property being electromotive force developed in said film to said electrically conducting material when said condition

includes temperature", in combination with the remaining limitations of claims, second paragraph, set forth in this Office action.

***Response to Arguments***

10. Applicant's arguments filed on December 14, 2004 have been fully considered but they are not persuasive.

Applicant states that the original specification describes a positive thermal strain in table 1. This argument is not persuasive because, A) table 1 describes thermal expansion coefficients of some materials, not thermal strains, B) it is very well known in the art that the thermal coefficients can be positive, however, the presence of the table 1 does not positively support the statement that the claimed thermal strain is positive.

Applicant states that Budhani does not teach a positive strain less than 0.006. This argument is not persuasive because, although Budhani does not explicitly describe a positive thermal strain being less than 0.006, Budhani discloses all the materials (nickel based superalloy, alumina) described by applicant (specification, paragraph [0021], paragraph [0024] and table 1). These materials, as admitted by applicant in the arguments (page 12, December 14, 2004), provide a positive strain less than 0.006. Therefore, it would be obvious that the same materials (combination thereof) provide the same adhesion/ deformation and thus, the same strain as claimed by applicant.

With respect to claim 12: applicant states that the applied references do not teach a positive less than 0.006 strain. This argument is not persuasive because claim 12 does not require a positive strain.

Also, please note that, according to the calculation of thermal strain, shown by applicant in arguments, page 12, December 14, 2004, the thermal strain is not less but above 0.006.

With respect to JP: the argument is now moot.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

**Dills (U.S. 3890456) discloses all the subject matter claimed by applicant including the same materials, i.e., nickel based superalloy substrate (turbine substrate) coated with an aluminum oxide and having a Pt/Ph thermocouple on top of the coating.**

**Przybyszewski (U.S. 4851300) discloses all the subject matter claimed by applicant including, as shown in Figs. 1-2 a superalloy substrate (turbine substrate) coated with an alumina and aluminum oxide and having noble metal thermocouple films on top of the coating.**

Any inquiry concerning this communication should be directed to the Examiner Verbitsky who can be reached at (703) 306-5473 Monday through Friday 8:00 to 4:00 ET.

Any inquiry of general nature should be directed to the Group Receptionist whose telephone number is (703) 308-0956.

GKV

*Gail Verbitsky*  
Primary Patent Examiner, TC 2800



March 17, 2005